Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

CLAIMS

YO998-056

1. A method comprising:

disposing on a surface a layer of material;

disposing in said layer of material a resist material;

said material having a crosslink density sufficiently high that said material and said resist do not substantially intermix.

2. A method according to claim 1, wherein said material is selected from the group consisting of a novolak

3. A method according to claim 1, wherein said material is selected from the group consisting of novolac/diazonapthoquinone resists, polysulfones, polyhudroxy styrene bases materials, polyimade materials cast from solvents containing no amines.

4. A method according to claim 1, wherein said resist is exposed to energy to form a pattern in said resist.

5. A method according to claim 4, wherein said energy is a beam selected from the group consisting of electromagnetic radiation and a particle beam.

6. A method according to claim 5, wherein said particle beam is an electron beam.

7. A method according to claim 1, wherein said material has an index of refraction from about 1.4 to about 2.1 and an extinction coefficient from about 0.1 to 0.6 at 365, 248, 193 and 157 nm.

8. A method according to claim 1 further including forming a pattern in said resist material, developing said pattern to form a sub 200 nm feature in said layer of material.

8. A method comprising:

disposing on a surface of an electronic device a novolak material;

curing said material to a predetermined degree of crosslinking;

disposing on said novolak material a resist material, said degree of crosslinking being sufficient to substantially prevent said resist material` from intermixing with said novolak material;

exposing said resist to a pattern of energy selected from the group consisting of electromagnetic radiation and a particle beam to form a pattern of exposed and unexposed regions in said resist;

developing said pattern to remove either said exposed or said unexposed regions of said resist to expose said layer of material where said resist in removed;

removing said layer of material where said resist is removed to leave on said electronic device a bilayer of said novolak material and said resist having a pattern therein having regions within which said surface of said electronic device is exposed.

9. A method according to claim 8, wherein said novolak has an index of refraction which is greater than about 1.65 and less than about 1.95 at wavelength of 248nm.

10. A method according to claim 8, wherein said novolak has an extinction coefficient $0.12<k<0.45$ at wavelength of 248nm.

11. A method according to claim 8, wherein said novolak has a molecular weight ranging from 2000 to 30000, preferably above 8500 and polydispercity ranging from 1 to 15, preferably less than 3.

12. A method according to claim 8, wherein said novolak has been crosslinked with heat to a temperature range of 180°C to 252°C under different processing conditions.

13. A method according to claim 8, wherein said novolak has been crosslinked with mid and deep UV or e-beam or other sort of irradiation.

14. A method according to claim 8, wherein said novolak has a thickness ranging from 2000 to 10000A.

15. A method according to claim 8, wherein said novolak has been removed by dry etching process in an oxygen plasma.

16. A method according to claim 2, wherein said layer of novolak material has an index of refraction from about 1.65 to about 1.95 and an extinction coefficient from about 0.16 to about 0.4 at 248nm.

17. A structure comprising:

a surface having a layer of material disposed therein;

a layer of resist material disposed on said layer of material;

said material having a crosslink density sufficiently high that said material and said resist are not substantially intermixed.

18. A method according to claim 1 wherein the crosslinking is dependent on the processing conditions- bake, temperature, time as well as the formulation of underlayer- i.e. the crosslinker that is put into the formulation, and the amount of crosslinker. It is a combination of designed formulation and processing conditions. If the underlayer is not appropriately designed significant residue occurs sometimes even in the larger features due to (1) interfacial mixing of resist and underlayer (2) diffusion of acid or other components of the resist into underlayer and (3) potential outgassing of components from underlayer into resist.